Article

Semen Modulates Cell Proliferation and Differentiation-Related Transcripts in the Pig Peri-Ovulatory Endometrium

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Table S1. Fold change of the differential mRNA expression ($p < 0.05$, red: False Discovery Rate, $q < 0.05$) in the different segments of the sow reproductive tract (cervix to infundibulum), 24 h post-treatment.

Gene Symbol	Natural Mating		Semen-AI		SP-AI		SP-TOTAL	
	UP	**DOWN**	**UP**	**DOWN**	**UP**	**DOWN**	**UP**	**DOWN**
ACKR1	-	Isth (-1.78)	Cvx (1.61)	-	-	-	-	-
ACKR2	Amp (1.19), Inf (1.26)	Cvx (-1.44)	-	-	-	-	-	-
ACKR3	-	Cvx (-1.9), DistUt (-3.21), ProxUt (-2.59), UTJ (-2.33), Isth (-2.45)	-	-	-	DistUt (-1.37)	-	Cvx (-1.76)

ACKR4	UTJ (1.23), Inf (1.57)	-	ProxUt (1.39)	-	-	-	Inf (1.17)	Cvx (-1.29)
CCL1	-	-	-	-	-	-	-	-
CCL11	Isth (1.39)	-	UTJ (1.22), Isth (1.25)	-	-	ProxUt (-1.13)	-	ProxUt (-1.23)
CCL14	DistUt (1.76)	-	Cvx (1.27)	-	-	-	-	-
CCL16	-	-	UTJ (1.21)	Isth (-1.14)	-	-	DistUt (1.15)	-
CCL19	Inf (1.26)	-	-	-	Inf (1.25)	-	Amp (1.18)	-
CCL2	-	Cvx (-5.23)	-	-	-	-	-	-
CCL20	-	Cvx (-6.81)	Inf (1.18)	-	Inf (1.18)	-	-	-

CCL21	-	-	-	-	-	-	-	-
CCL22	Amp (1.3)	-	-	-	-	-	-	-
CCL23	-	-	Amp (1.36)	-	Amp (1.43)	-	-	-
CCL25	-	-	-	-	-	Inf (-1.08)	-	-
CCL27	ProxUt (1.26)	Isth (-1.2)	-	-	-	-	-	-
CCL28	Cvx (2.3), Inf (3.72) UTJ (2.72), Amp (2.89)	-	-	UTJ (-2.08)	-	-	-	-
CCL3L1	-	-	-	-	-	-	-	-

CCL4	Inf (1.37)	-	-	-	-	-	-	-
CCL5	Inf (1.13)	-	-	UTJ (-1.48)	-	-	-	-
CCR1; XCR1	-	Cvx (-3.06)	-	-	-	-	-	-
CCR10	ProxUt (1.21), Inf (1.21)	-	-	-	-	-	-	-
CCR7	ProxUt (1.23)	-	-	-	-	-	-	-
CCR9	-	Cvx (-1.3)	-	-	-	-	-	Cvx (-1.25)
CMKLR1	-	-	Cvx (1.61), ProxUt (1.35)	-	-	-	-	-

Gene								
CXCL10	-	Cvx (-4.69), Amp (-3.69)	-	Amp (-3.22)	-	Amp (-1.9)	UTJ (2.19)	-
CXCL11	-	Cvx (-3.45), ProxUt (-4.44), Amp (-2.45)	-	Amp (-2.37)	-	-	-	-
CXCL12	-	-	-	-	-	-	-	-
CXCL14	Amp (2.62), Inf (1.77)	-	-	Cvx (-2.19), UTJ (-5.56), Isth (-4.07)	-	UTJ (-3.31), Isth (-5.82)	-	-
CXCL16	-	-	-	UTJ (-2.13)	-	-	-	-
CXCL2	-	Cvx (-3.96)	-	UTJ (-6.12)	-	-	-	-

CXCL8; *LOC100620730*	-	Cvx (-4.38), ProxUt (-3.06)	-	UTJ (-5.78)	-	-	-	-
CXCL9	UTJ (1.43)	-	ProxUt (2.21)	-	-	-	UTJ (2)	-
CXCR1	-	-	-	-	-	Cvx (-2)	-	-
CXCR2	-	-	-	-	-	-	-	-
CXCR3	Inf (1.21)	-	Cvx (1.37)	-	-	-	-	-
CXCR4	DistUt (1.68), UTJ (1.75), Isth (5.1), Amp (1.29),	-	-	-	-	-	-	-

CXCR5	Inf (2.22), Amp (1.27), Inf (1.21)	-	-	-	-	-	-	-
CXCR6	-	-	-	-	-	-	-	-
FAM19A1	-	-	Amp (1.31), Inf (1.38)	-	-	ProxUt (-1.26)	-	-
FAM19A3	-	UTJ (-1.33)	-	-	Isth (1.23)	-	Isth (1.15)	UTJ (-1.46), Amp (-1.36)
FAM19A4	-	Cvx (-3.35), DistUt (-1-97), ProxUt (-2.36),	-	Cvx (-2.13), ProxUt (-2.04)	-	ProxUt (-1.67)	Inf (1.3)	-

		UTJ (-2.07), Isth (-1.57), Amp (-2.18), Inf (-2.3)						
FGF1	DistUt (1.67), ProxUt (1.23)	-	-	-	-	-	-	-
FGF10	DistUt (1.63), Isth (1.62)	-	-	-	-	-	-	-
FGF12	-	Isth (-1.77)	-	-	-	-	-	-
FGF14	Cvx (1.47), ProxUt (1.18), Isth (2.14)	-	-	-	-	-	-	-

FGF17	ProxUt (1.17)	DistUt (-1.12)	-	DistUt (-1.1)	-	Isth (-1.35)	-	-
FGF18	Inf (1.55)	-	-	-	-	-	-	-
FGF19	-	Amp (-1.16)	-	-	-	-	-	-
FGF2	-	Cvx (-2.89), DistUt (-3.57), ProxUt (-2.62)	-	-	-	DistUt (-1.54)	-	Cvx (-1.94), DistUt (-1.24)
FGF20	-	DistUt (-1.29)	-	-	-	-	-	-
FGF21	ProxUt (1.32)	-	-	-	-	-	-	-
FGF23	-	-	-	-	-	-	-	-
FGF4	-	-	-	-	-	-	-	-

FGF5	-	-	ProxUt (1.12)	-	-	-	-	-
FGF6	-	-	-	-	-	-	-	-
FGF9	-	DistUt (-1.43)	-	DistUt (-1.44)	-	DistUt (-1.33), Isth (-1.33)	-	Isth (-1.35)
FGFBP1	-	Cvx (-9.15), DistUt (-3.37), ProxUt (-3.97), UTJ (-7.86), Isth (-5.99), Amp (-5.22), Inf (-3.99)	-	-	-	-	Amp (1.76)	-

FGFR1	-	DistUt (-2.37), ProxUt (-2.22), UTJ (-1.28)	-	DistUt (-1.38), ProxUt (-1.58)	-	-	-	DistUt (-1.22), ProxUt (-1.41)
FGFR1OP	-	Amp (-1.19), Inf (-1.33)	-	-	-	Isth (-1.18)	Cvx (1.23)	-
FGFR1OP2	-	ProxUt (-1.29)	-	-	-	-	-	-
FGFR2	Cvx (2.02), UTJ (1.28), Isth (1.19)	-	ProxUt (1.46)	-	-	-	-	-
FGFR2IIIC	UTJ (1.57),	-	UTJ (1.7)	-	-	-	-	-

	Isth (1.85)						
FGFR4	UTJ (1.28), Amp (1.2)	-	-	-	-	-	-
IGF1	-	DistUt (-2.99), ProxUt (-4.19), Inf (-4.67)	-	ProxUt (-4.8), Inf (-1.88)	-	ProxUt (-1.86)	-	-
IGF1R; LOC100623509; LOC100622436	Cvx (1.93), ProxUt (1.56), UTJ (1.49), Isth (1.65), Amp (1.77),	-	UTJ (1.36), Isth (1.3), Amp (1.12), Inf (1.41)	-	Isth (1.2)	-	-	-

	Inf (1.73)							
IGF2BP2	-	-	Inf (1.44)	UTJ (-1.65)	-	-	-	-
IGF2R; LOC100739014	Inf (1.15)	-	-	-	-	-	-	-
IGFALS	-	-	-	-	-	-	-	-
IGFBP1	-	-	-	-	-	-	-	-
IGFBP4	-	Cvx (-1.4), DistUt (-1.36)	-	-	-	DistUt (-1.13)	-	Cvx (-1.47), DistUt (-1.32)
IGFBP7	-	DistUt (-1.15), ProxUt (-1.39)	-	-	-	-	-	Cvx (-1.64)
IL10	UTJ (1.45)	-	-	-	-	-	-	-

IL10RA;	Amp (1.43),	-	Cvx (1.43), UTJ	-	-	-	-	-
LOC100622546	Inf (1.29)		(1.28)					
IL11RA	DistUt (1.2),	-	-	-	-	-	-	-
	ProxUt (1.27),							
IL12A	-	DistUt (-1.22)	-	-	-	-	-	-
IL12RB1	Amp (1.23),	-	ProxUt (1.25)	-	-	-	-	-
	Inf (1.1)							
IL12RB2	-	-	-	-	-	-	-	-
IL13	-	-	-	-	-	-	-	Cvx (-1.37)
IL13RA1	Amp (1.34),	PorxUt (-1.28)	-	-	-	-	-	-

	Inf (1.4)							
IL13RA2	-	-	-	-	Inf (1.37)	-	-	-
IL15	-	-	Cvx (1.35), Inf (1.47)	-	Inf (1.23)	-	Cvx (1.4), DistUt (1.33)	-
IL-15L	Amp (1.45)	-	Amp (1.22)	-	Amp (1.19)	-	-	-
IL16	Inf (1.3)	-	-	-	-	DistUt (-1.2)	-	-
IL17A	-	-	-	-	-	-	Cvx (1.17)	-
IL17B	-	-	UTJ (1.31)	-	-	-	-	-
IL17D	ProxUt (1.33), UTJ (1.35),	-	-	-	-	-	-	-

	Isth (1.94), Amp (1.33)							
IL17RB	DistUt (1.19), UTJ (2.14), Isth (2.68), Amp (2.09), Inf (1.6)	-	Isth (1.6)	ProxUt (-1.26)	-	-	-	-
IL17RC	-	-	-	-	Cvx (1.6)	-	-	Inf (-1.24)
IL17RD	-	UTJ (-1.36), Amp (-1.18), Inf (-1.61)	-	-	-	-	-	-

IL17RE; *LOC106505669*	Cvx (1.47), DistUt (1.4), ProxUt (1.27)	-	ProxUt (1.38)	-	Cvx (1.39), ProxUt (1.19)	-	Cvx (1.45)	-
IL17REL	ProxUt (1.26)	-	-	-	-	-	-	-
IL18	-	DistUt (-1.8), ProxUt (-1.85)	-	-	-	Proxut (-1.49)	-	-
IL18BP	-	-	-	-	-	-	-	Cvx (-1.26)
IL18R1	-	ProxUt (-2.18)	-	ProxUt (-1.61)	-	-	-	ProxUt (-1.5)
IL18RAP	Isth (1.22)	Cvx (-1.92)	-	-	-	Cvx (-1.57), Distut (-1.52)	-	-

IL19	-	Cvx (-1.29), DistUt (-1.36)	-	-	Isth (1.35)	-	Isth (1.36)	DistUt (-1.19)
IL1A	-	Cvx (-3.33), DistUt (-1.87), ProxUt (-1.58)	-	-	-	-	-	-
IL1B1; IL1B2	Inf (1.54)	-	-	-	-	-	-	-
IL1B2	-	Cvx (-1.33)	-	-	-	Isth (-1.35)	-	Amp (-1.73)
IL1RAPL1	-	-	-	-	UTJ (1.36)	-	-	-
IL1RAPL2	DistUt (1.28)	-	Inf (1.21)	-	-	-	-	-
IL1RL1	-	ProxUt (-1.34)	-	ProxUt (-1.18)	-	-	-	ProxUt (-1.15)

IL1RL2	-	-	-	-	-	-	-	-
IL2	-	-	UTJ (1.32)	-	-	-	-	-
IL20	-	-	-	ProxUt (-1.15)	-	-	-	-
IL21	-	-	-	Isth (-1.14)	UTJ (1.29)	-	-	Isth (-1.18)
IL21R	-	-	-	-	-	-	-	-
IL24; LOC100621682	-	Inf (-1.45)	-	DistUt (-1.1)	-	-	-	-
IL25	-	-	-	-	-	-	-	-
IL26; LOC100620108	-	-	-	-	UTJ (1.14)	-	-	-
IL27RA	-	-	Cvx (1.62)	-	-	-	-	-
IL28B	ProxUt (1.22)	-	-	-	-	-	-	-

IL2RG	Isth (1.42)	-	-	-	-	-	-	-
IL31	Amp (1.31)	-	-	-	UTJ (1.33)	-	-	-
IL31RA	DisUt (1.25), ProxUt (1.37), UTJ (1.76), Inf (1.23)	-	-	-	-	-	-	-
IL33	-	ProxUt (-1.84)	-	-	Inf (1.74)	-	UTJ (2.11), Amp (1.69)	-
IL34	DistUt (1.19), ProxUt (1.22), Amp (1.26),	-	-	-	-	-	-	-

	Inf (1.68)							
IL4	-	-	-	-	-	-	-	-
IL4I1	-	-	-	-	-	UTJ (-1.33)	-	-
IL4R	Amp (1.1), Inf (1.08)	-	-	-	-	DistUt (-1.31)	-	-
IL5	-	Amp (-1.23)	-	Amp (-1.23)	-	-	-	Amp (-1.19)
IL5RA	Amp (1.29)	-	-	-	-	-	-	-
IL-6; IL6	-	Amp (-1.24)	-	Amp (-1.36)	-	-	-	-
IL6ST	Isth (1.27)	Cvx (-1.31)	-	-	-	-	-	-
IL7; LOC100622266	-	ProxUt (-1.31)	DistUt (1.28)	-	-	-	-	-

IL7R	-	ProxUt (-1.43)	-	-	-	-	-	-
IL9	-	-	-	-	-	-	Inf (1.43)	-
IL9R	-	-	-	-	-	-	-	-
ILF2	-	Amp (-1.37), Inf (-1.85)	-	Inf (-1.47)	-	-	Isth (1.26)	-
ILF3	-	-	-	-	-	-	-	-
IRAK1	-	-	-	-	-	-	-	-
IRAK1BP1	-	-	DistUt (1.28)	Cvx (-1.83)	-	-	-	-
IRAK3	-	-	-	ProxUt (-1.34)	-	-	-	-

IRAK4	-	DistUt (-1.19), ProxUt (-1.48)	-	UTJ (-1.29)	Inf (1.29)	-	-	-
LOC100516362; LOC106509761 (IL1R2-like)	Isth (1.21)	-	-	-	Isth (1.15)	-	-	-
LOC100518910 (IL17RA-like)	-	-	-	-	-	DistUt(-1.26), Isth (-1.45)	-	DistUt (-1.28)
LOC100622457 (IL20Rα)	-	Isth (-2.86)	-	UTJ (-4.04)	-	Isth (-1.7)	-	Amp (-2.11)
LOC100626904 (IL1R1)	UTJ (1.7), Isth (1.94),	-	-	-	-	-	-	-

	Inf (1.5)							
LOC100628187; IL22	-	-	-	-	-	-	-	-
LOC102162067 *(IL6Rα-like)*	ProxUt (1.32), Amp (1.38), Inf (1.41)	-	-	-	-	-	-	-
NFIL3	UTJ (1.71), Isth (3.61), Amp (2.09), Inf (1.98)	-	-	-	-	-	-	Cvx (-1.8), ProxUt (-1.34), Inf (-1.39)

NLRP3	DistUt (1.34), UTJ (1.66)	-	-	-	-	-	UTJ (1.25)	-
PPBP; LOC100524561; LOC100620821	-	-	-	-	-	DistUt (-1.19)	-	-

* Cvx: cervix; DistUt: distal uterus; ProxUt: proximal uterus; UTJ: utero-tubal junction; Isth: isthmus; Amp: ampulla; and Inf: infundibulum. Natural mating: sows mated with a boar; Semen-AI: sows artificially inseminated with the sperm-peak portion extended to 50 mL with Beltsville thawing solution (BTS); SP-AI: sows cervically infused with the sperm-free seminal plasma (SP) from pooled sperm-peak portion (50 mL); SP-TOTAL: sows cervically infused with the sperm-free SP of the whole ejaculate (50 mL). All treatments were compared with controls. $p < 0.05$ relative to negative control.
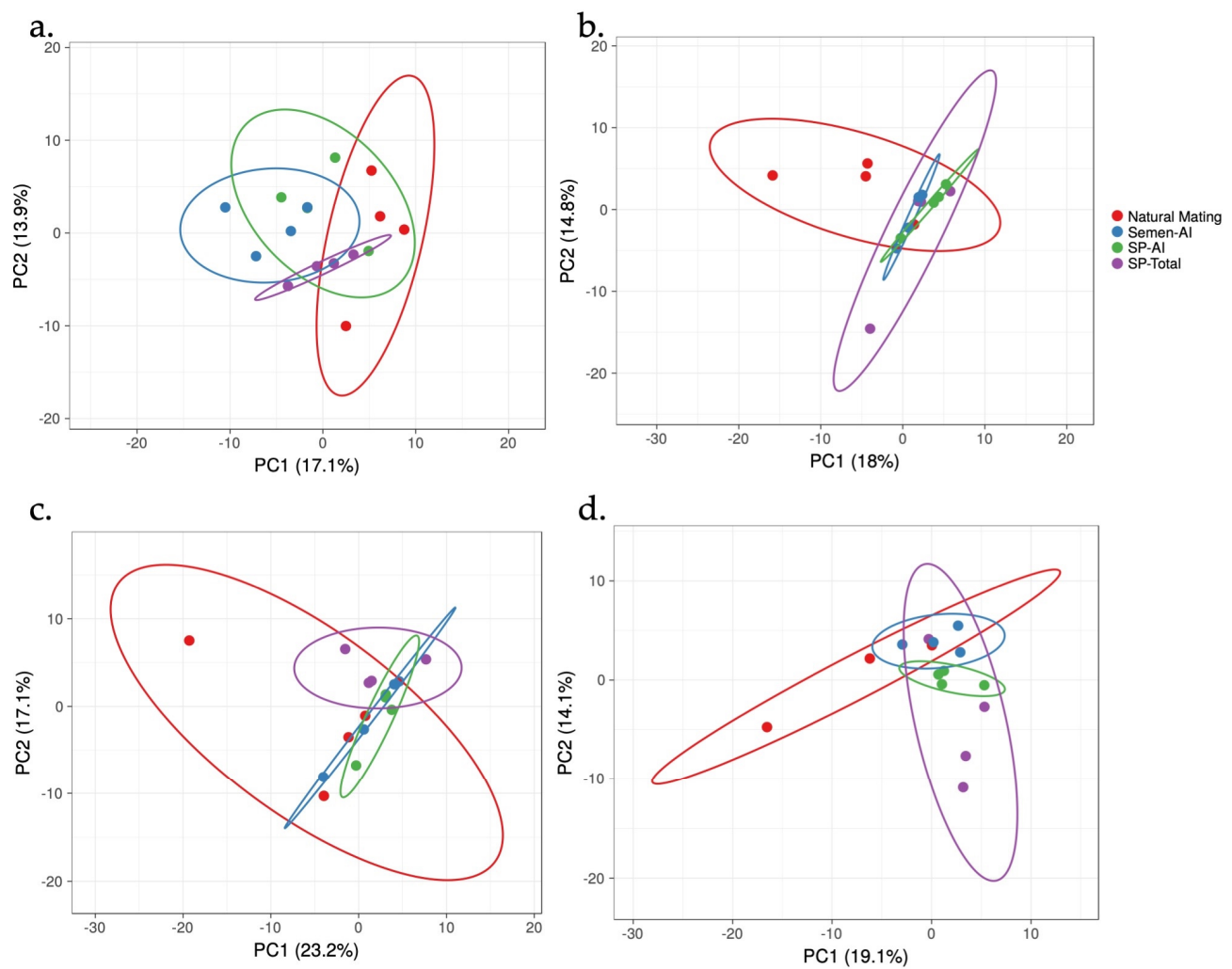
Figure S1. Principal Component Analysis of the genes included in this study of natural mating (red); Semen-AI (blue); SP-AI (green); and SP-Total (purple) treatment groups. a. Cvx: cervix; b. Isth: isthmus; c. Amp: ampulla; and d. Inf: infundibulum.
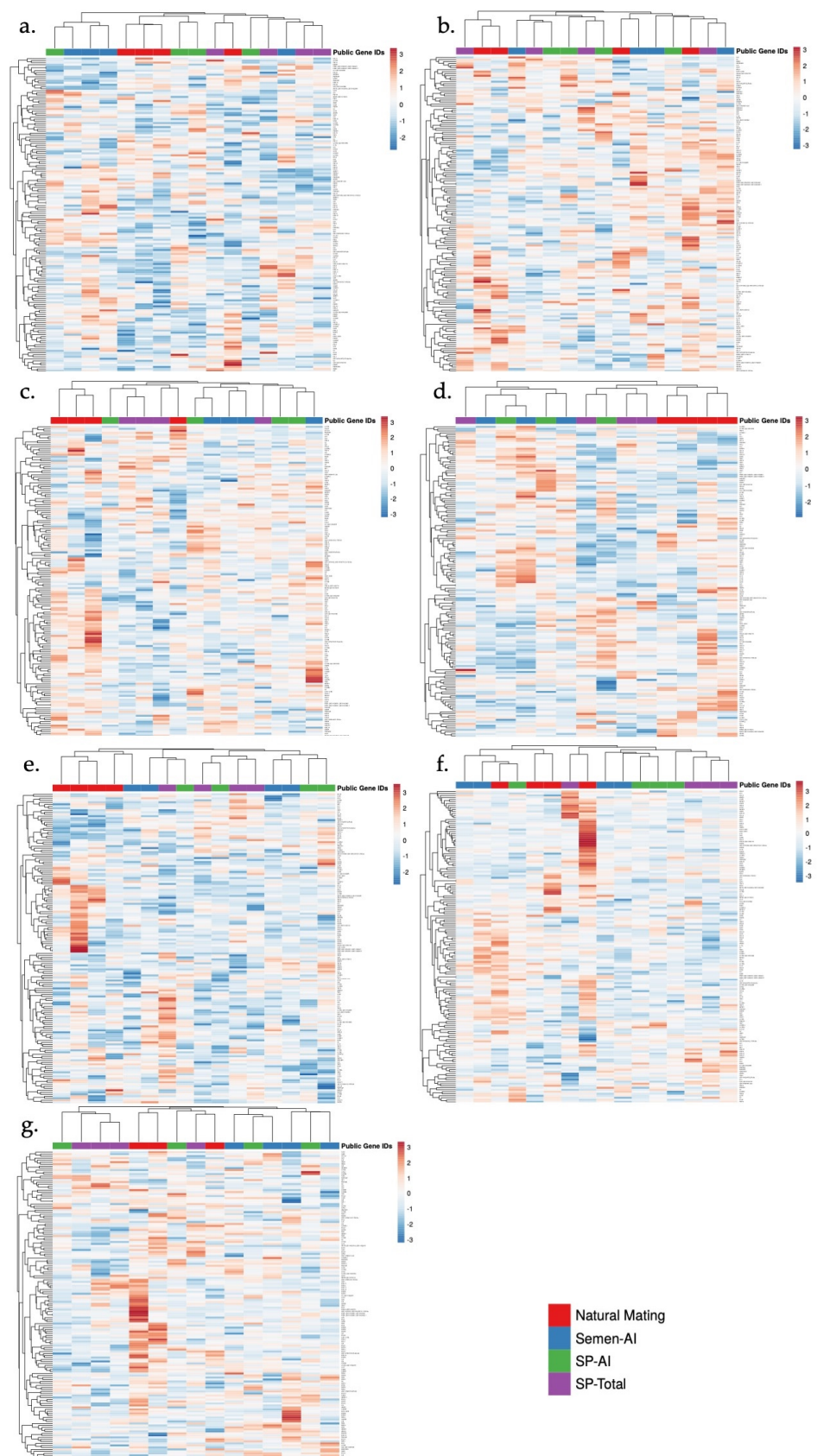
Figure S2. Heatmap of the genes included in this study of natural mating (red); Semen-AI (blue); SP-AI (green); and SP-Total (purple) treatment groups. a. Cvx: cervix; b. DistUt: distal uterus; c. ProxUt: proximal uterus; d. UTJ: utero-tubal junction; e. Isth: isthmus; f. Amp: ampulla; and g. Inf: infundibulum.